REMARKS

Prior to this Reply, Claims 1-18 and 20-101 were pending. No claims are being amended, added or cancelled. Accordingly, Claims 1-18 and 20-101 are now at issue in the present case.

I. Claim Rejections

Claims 1-18, 20-29, 38, 42, 43, 50, 55-58, 61, 63, 64 and 66-73 were rejected. Specifically, Claims 1, 6-18, 20-26, 28, 64 and 67-73 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,462,496 to Hassan et al. (hereinafter "Hassan '496"). Claims 14-18 and 21 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,465,035 to Scaramuzzo Jr. et al (hereinafter "Scaramuzzo"). Claims 38, 42, 43, 50, 57, 58, 61 and 63 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,821,717 to Hassan et al. (hereinafter "Hassan '717"). Claim 2 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hassan '496 in view of U.S. Patent No. 6,088,185 to Ratliff et al. (hereinafter "Ratliff"). Claims 2, 4 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hassan '496 in view of U.S. Patent No. 5,491,394 to Harwood et al. (hereinafter "Harwood"). Claims 3, 27, 29 and 66 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hassan '496 in view of Hassan '717. Claims 50, 57, 58, 61 and 63 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,422,027 to Mohlere (hereinafter "Mohlere") in view of Hassan '717.

II. Allowed and Allowable Claims

Claims 30-37, 44-49 and 74-101 were allowed. Claims 39-41, 51-54, 59, 60, 62 and 65 were objected-to as being dependent upon a rejected base claim. The Examiner indicated that such claims would be allowable if they were rewritten in independent form to include all of the limitations of their base claims and any intervening claims. Instead of writing the objected-to claims in independent form, Applicant offers the arguments presented below.

III. Rejection of Claims 1, 6-18, 20-26, 28, 64 and 67-73 under 35 U.S.C. § 102(b)

Rejection of Claims 1, 6-18, 20-26, 28, 64 and 67-73 under 35 U.S.C. § 102(b) as being anticipated by Hassan '496 is respectfully traversed because Hassan '406 does not disclose all of the limitations of the claims.

Regarding Claim 1, the Examiner interprets Hassan '496 to disclose a transconductance amplifier 410 (FIG. 4) to detect a current by comparing a coil current and a command current (Col. 4, lines 11-35). It is respectfully submitted that the amplifier 410 is not a transconductance amplifier that detects an error current by comparing a coil current and a command current, as claimed. Hassan '496 states that the amplifier 410 simply converts a voltage V_{SNS} (FIG. 3) to a current. In Col. 3, lines 44-62, Hassan '496 describes the operation of the amplifier 410. The coil current (hereinafter "I_S") through the sense resistor R_{SENSE} establishes voltages V_{SNS} and V_{SNSN} across terminals 332 and 334 of the sense resistor R_{SENE}, respectively. As shown in FIG. 4, the first input of the amplifier 410 is connected to the terminal 332, and the second input of the amplifier 410 is connected to the terminal 334 through a resistor R_1. A voltage (hereinafter "V") at the second input of the amplifier 410 (and at the gate of the NFET 412) is $V = I_{VMA} \times R_1 =$

$V_{SNS} - V_{SNSN}$ (Hassan '496, Col. 3, lines 62-65). The amplifier 410 generates its output current based on the input voltages V_{SNS} and V.

Thus, the difference in voltage between V_{SNS} and V_{SNSN} is impressed on the source of NFET 412, and voltage V_{SNS} determines the amount of current output from the amplifier 410 (Hassan '496, Col. 3, lines 44-62). In operation, the amplifier 410 converts the voltage V_{SNS} to an output current at the gate of the NFET 412 which turns the NFET 412 on/off. By using the voltage V_{SNS} to control the operation of the NFET 412 via the amplifier 410, the level of the current I_{VMA} from the drain to the source of the NFET 412 is controlled (Hassan '496, Col. 4, lines 15-19). This in turn controls the level of difference current $I_{VMAG} = I_{DAC} - I_{VMA}$, wherein I_{DAC} is a reference current (Hassan '496, Col. 4, lines 18-21). The difference current I_{VMAG} establishes a voltage V_{MAG} across the filter 404 which is input to a linear or PWM motor control circuit (Hassan '496, Col. 4, lines 25-29).

The current I_{VMA} is compared to the reference current I_{DAC}, and the resulting difference I_{VMAG} is transformed to the voltage V_{MAG}. Thus, the voltage V_{SNS} is transformed from the voltage domain to the current domain and then back to the voltage domain. The output voltage V_{SNS} from the sense resistor R_{SENSE} is converted to the current I_{VMA} using the amplifier 410 (Hassan '496, Col. 4, lines 29-35). The current I_{VMA} through the drain to source of FET 412 depends on the voltages V_{SNS} and voltage V_{SNSN}, wherein the amplifier 410 is used to control the current I_{VMA} as a function of the voltages V_{SNS} and voltage V_{SNSN} (Hassan '496, Col. 4, lines 15-19).

Accordingly, in Hassan '496, the amplifier 410 controls the current I_{VMA} based on the voltages V_{SNS} and V_{SNSN} across the resistor R_{SENSE}. The amplifier 410 detects the difference between the voltages V_{SNS} and V_{SNSN} to control the current I_{VMA} (Hassan '496, Col. 3, lines 44-

62). The amplifier 410 does not detect an error current from the coil current I_S through the resistor R_{SENSE} and the reference current I_{DAC}. Therefore, the amplifier 410 does not "detect an error current by comparing said coil current and a command current," as required by Claim 1.

Unlike the claimed invention, the amplifier 410 does not compare a sensed coil current and a command current, and the output of the amplifier 410 is not a detected error current. Rather, the amplifier 410 converts the V_{SNS} voltage to an output current wherein the voltage V_{SNS} determines the amount of current output from the amplifier 410. The amplifier 410 impresses the voltage difference between V_{SNS} and V_{SNSN} (i.e., voltage across resistor 330) on the NFET 412, wherein the current from transconductance circuit 410 turns on NFET 412. Therefore, unlike the claimed invention, output of the amplifier is not a detected error current. The amplifier 410 has nothing to do with "a transconductance amplifier to detect an error current by comparing said coil current and a command current," as required by Claim 1.

On page 12 of the Office Action (Response to Arguments Section), the Examiner refers to Col. 4, lines 35-45, and states that the amplifier 410 "compares a coil current I_{vma}, which is equal to V_{sns}-V_{snsn}, (Col. 3: 45-50, 63-65) to a reference current I_{dac} (Col. 4:11-15)." However, as discussed above in relation to Hassan '496 Col. 3, lines 45-50 and 63-65 (relied on by the Examiner), I_{VMA} is not equal to V_{SNS} - V_{SNSN}, rather $V_{SNS} - V_{SNSN} = I_{VMA} \times R_1$. Further, as mentioned above, Hassan '496 Col. 4, lines 11-15 and 35-45 (relied on by the Examiner) discusses the bias current generator 418 in FIG. 5 which generates I_{DAC}. There is no disclosure in the passages relied on by the Examiner (or elsewhere) in Hassan '496 that the amplifier 410 compares the currents I_{VMA} and I_{DAC}.

The Examiner has interpreted the amplifier 410 to detect an error current from a sense current and a command current. However, Hassan '496 does not disclose such limitations. As

Col. 4, lines 11-35 clearly describes, the bias current generator 418 generates a bias current I_{BIAS} for the DAC 416, not a command current. The current I_{DAC} output from the IDAC 416 is a reference current and the current I_{VMA} through the drain to source of FET 412 depends on the voltage at terminal 332 and terminal 334, namely the voltage V_{SNS} and voltage V_{SNSN}. Accordingly, the amplifier 410 does not detect an error current from the current I_{DAC} and the current I_{VMA}. Rather, the amplifier 410 detects the difference between the voltages V_{SNS} and V_{SNSN} to control the current I_{VMA} (Hassan '496, Col. 3, lines 44-62).

Further, Hassan '496 does not disclose "a compensator to integrate said error current into said coil current," as required by Claim 1. In the passages cited by the Examiner, Hassan '496 simply states that the filter 404 generates an output voltage V_{MAG} at terminal 422 from the current I_{VMAG}, wherein the voltage V_{MAG} is input to the PWM circuit (Col. 5, lines 32-48). Hassan '496 further states that the voltage V_{SNS} is transformed from the voltage domain to the current domain and then back to the voltage domain. The output voltage V_{SNS} from the sense resistor is converted to the current I_{VMA} (Col. 4, lines 35-45). Thus, circuit 404 generates a voltage from a current, rather than integrating an error current into the coil current, as claimed. The specification originally filed is replete with examples of how integration of error current into the coil current is utilized.

For at least the above reasons, Applicant believes that Claim 1 is patentably distinguishable from Hassan '496. For at least the same reasons provided with respect to Claim 1, Applicant believes that all claims that depend from Claim 1 are patentably distinguishable from Hassan '496.

Claim 64 was rejected for reasons similar to those provided in rejecting Claim 1. Applicant submits that, for at least the reasons provided above in relation to Claim 1, Claim 64 is patentably distinguishable from Hassan '496.

Claims 6, 7, 9, 11 depend from Claim 1 **and Claims 67, 68, 70, 72** depend from Claim 64. Applicant believes that such claims are patentably distinguishable from Hassan '496 at least for the reasons presented above with respect to Claims 1 and 64.

Regarding Claim 8, it is respectfully submitted that Hassan' 496 does not disclose that the driver further comprises: "a driver amplifier to supply said coil current, said driver amplifier coupled to said compensator," as required by Claim 8. In rejecting Claim 1 above, the Examiner stated that the amplifier 410 in FIG. 4 of Hassan '496 is a transconductance amplifier. Then in rejecting Claim 8, the Examiner interprets the amplifier 410 as a driver amplifier to supply a coil current. These two interpretations of the amplifier 410 are not only inaccurate, but also incongruent.

As discussed above, the amplifier is not a transconductance amplifier to detect an error current by comparing said coil current and a command current, as required by Claim 1. Indeed, the amplifier 410 is a device that converts the V_{SNS} voltage to a current output for turning the FET 412 on and off. Therefore, the amplifier 410 does not supply a coil current and, as such, is not a driver amplifier to supply said coil current, as required by Claim 8. For at least these reasons, Applicant believes that Claim 8 is patentably distinguishable from Hassan '496.

Claim 69 was rejected for reasons similar to those provided with respect to Claim 8. Applicant believes that Claim 69 is patentably distinguishable from Hassan '496 for at least the reasons provided with respect to Claim 8.

Regarding Claim 10, it is respectfully submitted that Hassan '496 does not disclose that: "said command current is received at said driver from a microcontroller," as required by Claim 10. Nowhere in Hassan '496 is there any disclosure that the controller unit 160 provides any kind of command current, or that the driver 166 in any way receives a command current from the controller 160. If the Examiner believes otherwise, Applicant respectfully requests the Examiner to point to the specific passage in Hassan '496 where such limitations are disclosed. For at least the above reasons, Applicant believes that Claim 10 is patentably distinguishable from Hassan '496.

Claim 71 was rejected for reasons similar to those provided in rejecting Claim 10. Applicant believes that Claim 71 is patentably distinguishable from Hassan '496 for at least the reasons provided above in relation to Claim 10.

Regarding Claim 12, Applicant submits that Hassan '496 does not disclose that: "said transconductance amplifier includes a first input and a second input, such that said coil current is coupled to the first input of the transconductance amplifier, and said command current is coupled to the second input of the transconductance amplifier, wherein the transconductance amplifier detects said error current by determining the difference between the coil current and the command current," as required by Claim 12. As discussed in relation to Claim 1 above, the amplifier 410 does not compare a sensed coil current and a command current. Furthermore, the output of the amplifier 410 is not detecting an error current. Rather, the amplifier 410 converts the V_{SNS} voltage to an output current, wherein the voltage V_{SNS} determines the amount of current output from the amplifier 410.

Not only is the amplifier 410 not a transconductance amplifier, but the inputs to the amplifier 410 are not a sense current and a commend current as required by Claim 12, and

discussed in relation to Claim 1 above. In Col. 3, lines 50-62, Hassan '496 clearly states that connected to terminal 332 is transconductance amplifier 410 to convert the voltage V_{SNS} to a current. The other input to transconductance circuit 410 is connected to the source of NFET 412. Thus, the difference in voltage between V_{SNS} and V_{SNSN} is impressed on the source of NFET 412, and voltage V_{SNS} determines the amount of current output from the transconductance amplifier 410. The inputs to the amplifier 410 are not a sense current and a commend current as required by Claim 12. For at least the above reasons, Applicant submits that Claim 12 is patentably distinguishable from Hassan '496.

Regarding Claim 13, it is respectfully submitted that Hassan '496 does not disclose that: "said compensator is coupled to a gain buffer," as required by Claim 13. No gain buffer is disclosed in Hassan '496. The element 404 (relied on by the Examiner), comprises capacitors and resistors, but is not a gain buffer as claimed. Rather element 404 is a loop filter for developing voltage V_{MAG} from I_{VMAG} for coil control (Col. 5, lines 35-43). Further, as claimed, the compensator is coupled to the gain buffer, and the compensator integrates said error current into said coil current. In Hassan '496, element 404 is not coupled to a compensator as claimed. Rather, element 404 is coupled to the current I_{VMAG}.

Claim 73 was rejected for reasons similar to those provided with respect to Claim 13. Therefore, Applicant believes that Claim 73 is patentably distinguishable from Hassan '496 at least for reasons similar to those provided with respect to Claim 73.

Regarding Claim 14, for at least the reasons provided above in relation to Claim 1, it is respectfully submitted that Hassan '496 does not disclose: "determining an error current by comparing said coil current and a command current using a transconductance amplifier; and integrating said error current into said coil current," as required by Claim 14. Accordingly,

Applicant believes that Claim 14 and all claims that depend therefrom are patentably distinguishable from Hassan '496.

Regarding Claim 23, Hassan '496 does not disclose a current control device for a voice coil motor driver, said voice coil motor driver coupled to a microprocessor to receive commands specifying a command current for a voice coil motor. Despite the Examiner's interpretation, Hassan '496 does not disclose that the controller unit 160 provides any kind of command current, or that the driver 166 in any way receives a command current from the controller 160. In addition, Hassan '496 does not disclose that the current control device comprises an amplifier to drive said voice coil motor with a coil current, and a compensator circuit to integrate an error current with said command current to generate said coil current, wherein said error current is detected by comparing the command current and said coil current sensed with a sensor coupled between said amplifier and said voice coil motor, as claimed. The amplifier 410 in Hassan '496 is not an amplifier to drive the voice coil motor with a coil current, as claimed. As discussed in relation to Claim 1, the amplifier 410 converts the V_{SNS} voltage to an output current wherein the voltage V_{SNS} determines the amount of current output from the amplifier 410. For at least these reasons, Applicant believes that Claim 23 is patentably distinguishable from Hassan '496.

Regarding Claim 24, it is respectfully submitted that Hassan '496 does not disclose that the current control device further comprises: "a transconductance amplifier to detect and calculate said error current by comparing the command current and said coil current," as required by Claim 24. As discussed above, the amplifier 410 does not compare a sensed coil current and a command current, and the output of the amplifier 410 is not detecting an error current. Rather, the amplifier 410 converts the V_{SNS} voltage to an output current wherein the voltage V_{SNS}

determines the amount of current output from the amplifier 410. Therefore, Applicant believes that, for at least these reasons, Claim 24 is patentably distinguishable from Hassan '496.

Claims 25 and 26 depend from Claim 23 and are believed to be patentably distinguishable from Hassan '496 for at least the reasons provided with respect to Claim 23.

Regarding Claim 28, it is respectfully submitted that Hassan '496 does not disclose that: "said amplifier is coupled to a set of transistors to provide said coil current," as required by Claim 28. As noted above, the amplifier 410 is not an amplifier to drive the voice coil motor with a coil current. Further, Hassan '496 does not show that the amplifier 410 is connected to a set of transistors to provide said coil current. For at least these reasons, Applicant believes that Claim 28 is patentably distinguishable from Hassan '496.

IV. Rejection of Claims 14-18 and 21 under 35 U.S.C. 102(b)

Rejection of Claims 14-18, and 21 under 35 U.S.C. 102(b) as being anticipated by Scaramuzzo is respectfully traversed because Scaramuzzo does not disclose all of the claimed limitations.

Regarding Claim 14, Scaramuzzo at Col. 4, lines 45-63 (relied on by the Examiner) does not disclose "determining an error current by comparing said coil current and a command current using a transconductance amplifier," as required by Claim 14. By contrast, Scaramuzzo at Col. 4, lines 45-63 describes that an amplifier 44 amplifies error between drive voltage V_{Icmd} and feedback voltage V_f. Further, Scaramuzzo does not disclose that the amplifier 44 determines an error current as claimed. Rather the amplifier 44 generates a voltage V_{app} to a bridge circuit 46 for driving a coil. Voltage V_{app} is not an error current as claimed. In addition, there is no disclosure in Scaramuzzo of: "integrating said error current into said coil current," as

claimed. Scaramuzzo does not integrate any current, let alone an error current into a coil current, as claimed. For at least these reasons, it is respectfully submitted that Claim 14 is patentably distinguishable from Claim 14. For at least the reasons provided with respect to Claim 14, Applicant submits that all claims that depend from Claim 14 are likewise patentably distinguishable from Scaramuzzo.

V. Rejection of Claims 38, 42, 43, 50, 57, 58, 61 and 63 under 35 U.S.C. § 102(b)

Rejection of Claims 38, 42, 43, 50, 57, 58, 61 and 63 under 35 U.S.C. § 102(b) as being anticipated by Hassan '717 is respectfully traversed because Hassan '717 does not disclose all of the claimed limitations.

Regarding Claim 38, as described below, it is respectfully submitted that Hassan '717 at Col. 3, lines 5-37 (relied on by the Examiner) does not disclose a method for controlling a voice coil motor accessing a track on a magnetic disk with a driver by: "supplying a coil current to said voice coil motor; amplifying said coil current; and shaping a command current waveform according to said coil current," as required by Claim 38.

In Col. 3, lines 10-15 (relied upon by the Patent Office), Hassan '717 does not disclose: "supplying a coil current to said voice coil motor," as required by Claim 38. Rather, Hassan '717 states that a device 10 supplies an input voltage representative of the desired actuator current. This has nothing to do with supplying a coil current, as claimed. Further, in Col. 3, lines 15-19 (relied upon by the Patent Office), Hassan '717 does not disclose: "amplifying said coil current," as required by Claim 38. Rather, Hassan '717 states that the amplifier 114 amplifies the voltage drop across the resistor 310. This has nothing to do with amplifying the coil current, as claimed. In addition, in Col. 3, lines 20-37 (relied upon by the Patent Office),

Hassan '717 does not disclose: "shaping a command current waveform according to said coil current," as required by Claim 38. Rather, Hassan '717 merely states that the error amplifier 112 takes the difference between the output of sense amplifier 114 and the output of low pass filter 111. This difference voltage is then compared to the reference voltage from reference source 115, and the difference between the two voltages is amplified to produce a target voltage. The target voltage is proportional to the difference between the desired and actual actuator currents, with a voltage offset. The target voltage is the desired voltage across actuator motor nodes 301 and 302 (Col. 3, lines 20-37). There is no shaping of a command current waveform according to the coil current. For at least these reasons, Applicant believes that Claim 38, and all claims that depend therefrom, are patentably distinguishable from Hassan '717.

Regarding Claim 42, it is respectfully submitted that Hassan '717 does not disclose supplying the coil current to a center tap coupling said voice coil motor to said driver, as required by Claim 42. In Col. 3, lines 39-67 of Hassan '717, there is no mention of such limitations. If the Examiner disagrees, the Examiner is respectfully requested to quote such language from Hassan '717. Accordingly, Applicant submits that Claim 42 is patentably distinguishable from Hassan '717.

Regarding Claim 43, it is respectfully submitted that Hassan '717 does not disclose amplifying said coil current with a current sense amplifier, as required by Claim 43. As discussed, in Col. 3, lines 10-19 (relied upon by the Patent Office), Hassan '717 merely mentions that a device 10 supplies an input voltage representative of the desired actuator current and that the amplifier 114 amplifies the voltage drop across the resistor 310. This has nothing to do with amplifying the coil current with a current sense amplifier, as claimed. Accordingly, Applicant believes that Claim 43 is patentably distinguishable from Hassan '717.

Regarding Claim 50, Hassan '717 does not show a voice coil motor having a first coil motor and a second coil motor, as claimed. Rather, motor 300 in Fig. 2 of Hassan '717 (relied on by the Examiner) has only one coil motor. Further, Hassan '717 does not disclose a sensor to sense a velocity voltage across said second coil motor, as claimed. Hassan '717 does not disclose that element 310 (relied on by the Examiner) is a sensor to sense a velocity voltage, as claimed. Hassan '717 does not disclose calculating a differential between a velocity voltage and a command voltage, as claimed. Col. 3, lines 20-37 (relied on by the Examiner) describes an error amplifier 112; however, the amplifier 112 takes the difference between the output of sense amplifier 114 and the output of low pass filter 111. This difference voltage is then compared to the reference voltage from reference source 115, and the difference between the two voltages is amplified to produce a target voltage. Clearly, the amplifier 112 does not calculate a differential between a velocity voltage and a command voltage, as claimed. The differential from the amplifier 112 is different from the differential calculated, as claimed. In addition, item 113 is not a retract amplifier that compensates the command voltage with the differential. Rather, item 113 is only used to retract the heads in case of fault, and does not perform any compensation of a command voltage with the differential (Hassan '717, Col. 5, lines 61-67). Element 113 is a VCM predrive that receives a fault signal from element 131 upon voltage fault.

For at least the above reasons, Applicant believes that Claim 50 is patentably distinguishable from Hassan '717. For at least the same reasons, Applicant believes that all claims that depend from Claim 50 are likewise patentably distinguishable from Hassan '717.

Claim 58 was rejected for reasons similar to those provided with respect to Claim 50. Therefore, Applicant believes that Claim 58 and all claims dependent therefrom are patentably distinguishable from Hassan '717 at least for the reasons provided in relation to Claim 50.

VI. Rejection of Claims 2-5, 27, 29, 50, 57, 58, 61, 63 and 66 under 35 U.S.C. § 103(a)

Rejection of Claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Hassan '496 in view of Ratliff is respectfully traversed because the references, alone or in combination, do not disclose "a force couple created by said current in said voice coil motor," as required by Claim 2. As discussed, Hassan '496 does not teach all of the limitations of Claim 1. Further, despite the Examiner's contention, Ratliff does not mention a force couple. In Col. 4, line 44 to Col. 5, line 15 (relied on by the Examiner), Ratliff does not disclose any limitation that even remotely resembles a force couple created by a coil current, or using a force couple wherein a first coil motor and a second coil motor of the voice coil motor are oppositely polarized to induce magnetic fields in opposite directions, as claimed.

Rejection of Claims 2, 4 and 5 under 35 U.S.C. § 103(a) as being unpatentable over Hassan '496 in view of Harwood is respectfully traversed because the references, alone or in combination, do not disclose all of the claimed limitations.

Regarding Claim 2, Hassan '496 and Harwood do not disclose "a force couple created by said current in said voice coil motor," as required by Claim 2. As discussed, Hassan '496 does not disclose all of the limitations of Claim 1. Further, despite the Examiner's contention, Harwood does not disclose the claimed limitation of a force couple. In Col. 3, lines 6-18 (relied on by the Examiner), Harwood simply describes that a magnet 28 has north and south poles, and that the magnet 28 is disposed between coils 30, such that when a current is provided to coils 30 in one direction the arm 22 rotates in a first direction, and when current provided to the coils 30 in a second direction, the arm 22 rotates in a second opposite direction. However, this has nothing to do with a coil current that creates a force couple in the voice coil motor as claimed. Harwood does not disclose using a force couple wherein a first coil motor and a second coil

motor of the voice coil motor are oppositely polarized to induce magnetic fields in opposite direction, as claimed. Generally, a force couple is defined by two parallel forces of equal magnitude, but opposite direction, applied to a structure at equal distances from the center of the mass. In Harwood, the magnet 28 and coils 30 do not provide a force couple. The coils 30 are simply energized in a first direction for rotating the arm in a first direction, and subsequently energized in a second direction to rotate the arm in a second opposite direction as needed. This is not force couple, as claimed.

Regarding Claims 4 and 5, as discussed, Hassan '496 does not teach all of the limitations of Claim 1, and nor does the combination of Harwood and Hassan '496.

Rejection of Claims 3, 27, 29 and 66 under 35 U.S.C. § 103(a) as being unpatentable over Hassan '496 in view of Hassan '717 is respectfully traversed because the references alone or in combination do not disclose all of the claimed limitations.

Regarding Claim 3, as discussed above, Hassan '496 does not teach all of limitations of Claim 1 (from which Claim 3 depends). Further, in Hassan '717, it is respectfully submitted that despite the Examiner's interpretation, the amplifier 114 is not coupled to transconductance amplifier, as claimed. Indeed, in Fig. 2 of Hassan '717 (relied on by the Examiner), the output of the amplifier is not coupled to the amplifier 128 (there is no coupling between elements 114 and 128). Accordingly, Applicant submits that Claim 3 is patentably distinguishable from Hassan '496 and Hassan '717, both alone and in combination.

Claim 66 was rejected for reasons similar to those provided with respect to Claim 3. Applicant submits that Claims 66 is patentably distinguishable from Hassan '496 and Hassan '717 at least for reasons similar to those provided with respect to Claim 3.

Regarding Claim 27, as discussed Hassan '496 does not disclose limitations of Claim 23 (from which Claim 27 depends). Further, Hassan '717 does not disclose a current sense amplifier between a sensor and a compensator, as claimed. In Hassan '717, element 112 (relied on by the Examiner) is not a compensator, rather it is an error amplifier. As claimed herein (Claim 23), a compensator circuit integrates an error current with a command current to generate a coil current. Element 112 does not perform any such function. In rejecting Claim 27, the Examiner has incorrectly interpreted amplifier 112. Furthermore, the Examiner's interpretation is incongruent with the Examiner's prior interpretation of element 112 in rejecting other claims. For at least these reasons, Applicant submits that Claim 27 is patentably distinguishable from Hassan '496 and Hassan '717.

Regarding Claim 29, Hassan '496 does not disclose a transconductance amplifier that calculates an error current by comparing a sense current with a command current (see related argument with respect to Claim 1). Further, Hassan '496 does not disclose an integrator, as claimed (see related argument with respect to Claim 1). In addition, Hassan '717 does not disclose a transconductance amplifier that calculates an error current by comparing a sense current and command current (see related argument with respect to Claim 3). The amplifier 128 in Fig. 2 of Hassan '717 (relied on by the Examiner) is not coupled to the amplifier 114, and indeed inputs of the amplifier 128 are not even a sense current and a command current for comparison. Element 128 does not calculate an error current, as claimed.

The sense amplifier 114 in Hassan '717 is not coupled to the transconductance amplifier 128 and does not function as claimed. Indeed, the sense amplifier 114 is a component of the actuator control block 110 for controlling the voice coil motor (Col. 3, lines 10-20), and the

transconductance amplifier 128 is a component of the spindle control block 120 for controlling the spindle motor (Col. 4, lines 1-9). One has nothing to do with the other.

Rejection of Claims 50, 57, 58, 61 and 63 under 35 U.S.C. 103(a) as being unpatentable over Mohlere in view of Hassan '717 is respectfully traversed because the references alone or in combination do not disclose all of the claimed limitations.

Regarding Claim 50, Mohlere does not disclose a driver for controlling a voice coil motor having a first coil motor and second coil motor, as required by Claim 50. It is respectfully submitted that in Fig. 2 of Mohlere, items Unit 1 and Unit 2 are two different, independent, voice coil motors. Indeed, Mohlere states in Col. 2, lines 34-44:

> The controller can handle two motors as is shown in FIG. 2. Each of the two shown control computer (CPU) channels 101 and 100 controls 1 channel ... The Motor(s) get driven by the AMDRIVE signal hh. The Graticule Position Sensor 201 of unit 1 attached to the motor 202 sends back indicating signals ee, ff and gg from which the controller 203 computes position, direction, and velocity information. Unit 2 acts in the same manner as unit 1.

Thus, Mohlere discloses two different, independent, voice coil motors that can be controlled, one at a time, by a controller. Mohlere does not disclose a voice coil motor having a first coil motor and a second coil motor, as claimed.

Further, Hassan '717 does not disclose "an error amplifier to calculate a differential between said velocity voltage and a command voltage," as required by Claim 50. In Col. 3, lines 20-37 (relied upon by the Examiner), Hassan '717 does not disclose such an error amplifier. Indeed, Hassan '717 in Col. 3, lines 12-19 states:

> A current control device 10, which may be, for example, a part of digital signal processing block 70, supplies an input voltage representative of the desired actuator current. This voltage is filtered by low pass filter 111. Sense amplifier 114 produces an output signal proportional to the actual current passing through

> actuator 300 by sensing and amplifying the voltage drop across sense resistor 310.

Then, Hassan '717 states that the "[e]rror amplifier 112 takes the difference between the output of sense amplifier 114 and the output of low pass filter 111" (Col. 3, lines 23-25). Therefore, there is no velocity voltage sensing in Hassan '717 and there is no use for it by modifying Hassan '717.

Further, Hassan '717 does not disclose "a retract amplifier to compensate said command voltage with said differential," as required by Claim 50. In rejecting Claim 50, the Examiner relies on Item 113 in Fig. 2 of Hassan '717. However, there is no teaching in Hassan '717 that Item 113 compensates a command voltage with a differential between the velocity voltage and the command voltage.

The Examiner further relies on Hassan '717, Col. 5, lines 37-67. However, there is no description therein of a retract amplifier as required by Claim 50. By contrast, in the relevant portion of that passage, Hassan '717 states that:

> ... When the supply voltage drops below a threshold level, voltage monitor 133 sends a fault signal to actuator retract block 131.... [W]hen actuator retract block 131 receives a fault signal from voltage monitor 133 on input port 131a indicating a loss of supply voltage, an output signal is sent to actuator motor predrive amplifier 113 causing fast retraction of the read head.
>
> When a head retract is requested for some non-critical reason, a slower retraction is desirable so as to avoid potential damage to the read heads caused by sudden acceleration. Thus, when a retract signal is received on input port 131b, actuator retract block 131 sends an output signal to actuator motor predrive amplifier 113 causing slow retraction of the read head.

Therefore, it appears that Hassan '717 cannot use velocity for VCM coil current control. It also appears that Hassan's error amplifier 113 does not and cannot use a velocity voltage.

Further, the VCM retract amplifier 131 in Hassan '717 is not a retract amplifier, as required by Claim 50.

Even further, there is no suggestion or motivation in either Mohlere or Hassan '717 to combine them. Even if Mohlere is combined with Hassan '717, the resulting combination does not disclose the claimed invention. This is because such a combination, if operational, may provide control for two different VCMs, and does not compensate a command voltage by a differential between a sensed velocity voltage and a command voltage, as required by Claim 50. Therefore, for at least the above reasons, Applicant submits that Claim 50, and the claims that depend therefrom, are patentably distinguishable from Mohlere and Hassan '717 both alone and in combination.

Claim 58 was rejected for reasons similar to those provided with respect to Claim 50. Accordingly, Applicant submits that Claim 58 is patentably distinguishable from Mohlere and Hassan '717 (both alone and in combination) for reasons similar to those provided with respect to Claim 50.

Regarding Claim 61, with reference to the reasons provided above in relation to Claim 50, there is no teaching in Hassan '717 of coupling a retract amplifier to the VCM, wherein the retract amplifier is for compensating the voltage command with the differential voltage between the velocity voltage and the command voltage. Further, the retract block 131 in Fig. 2 of Hassan (relied on by the Examiner) is not even an amplifier, as demonstrated above. Therefore, Applicant believes that Claim 61 is patentably distinguishable from Mohlere and Hassan '717 (both alone and in combination).

Regarding Claims 57 and 63, there is no teaching in Hassan '717, Col. 5, lines 37-67, that a retract amplifier, functioning as claimed in Claims 50 and 61 (respectively), is turned on

and off as required by Claims 57 and 63. Accordingly, for at least this reason, Applicant believes that Claims 57 and 63 are patentably distinguishable from Mohlere and Hassan '717 both alone and in combination.

Claims 55 and 56 are believed to be patentably distinguishable from Mohlere and Hassan '717 at least because they depend from Claim 50.

VII. Additional Claim Fees

In determining whether additional claim fees are due, reference is made to the Fee Calculation Table (below).

Fee Calculation Table

	Claims Remaining After Amendment		Highest Number Previously Paid For	Present Extra	Rate	Additional Fee
Total (37 CFR 1.16(c))	99	Minus	100	= 0	x $50 =	$ 0.00
Independent (37 CFR 1.16(b))	16	Minus	16	= 0	x $200 =	$ 0.00

As set forth in the Fee Calculation Table (above), Applicant previously paid claim fees for one hundred (100) total claims and for sixteen (16) independent claims. Accordingly, Applicant believes that no additional fees are due. Nevertheless, Applicant hereby authorizes the Commissioner to charge Deposit Account No. 50-2198 for any fee deficiencies associated with filing this paper.

VIII. Conclusion

Applicant believes that the application appears to be in form for allowance. Accordingly, reconsideration and allowance thereof is respectfully requested.

The Examiner is invited to contact the undersigned at the below-listed telephone number regarding any matters relating to the present application.

Respectfully submitted,

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